

**APPARATUS AND ASSOCIATED METHOD FOR DOWNLOADING AN
APPLICATION WITH A VARIABLE LIFETIME TO A MOBILE
TERMINAL**

FIELD OF THE INVENTION

5 This invention relates to an apparatus and method for
downloading content to a mobile terminal with communication
capabilities.

BACKGROUND OF THE INVENTION

Recent years have witnessed the emergence and proliferation of
10 the Internet, the World Wide Web ("WWW"), mobile communication
technologies and mobile computing devices. As technology advances,
telecommunications and computing are converging. Convergence is
producing devices that communicate over networks and integrate
media, telephony and computing.

15 Cellular communication networks, for example, allow subscribers
to communicate both voice and nonvoice data. Typically, a subscriber
pays a fee to obtain a subscription to a cellular network allowing the
subscriber to use the network. The subscriber uses a mobile terminal
to communicate on the cellular network. As technology advances,
20 mobile terminals are increasingly constructed to be contained in
smaller packages and also to provide greater functionality. One
example, of a "mobile terminal" is the rapidly proliferating "cell phone."

The same technological advances that have fostered the
proliferation of the cell phone have also fostered great advancements
25 in computing devices. Computing devices are becoming increasingly

smaller, faster, and more mobile. Technological advancement in computing devices and mobile terminals is blurring the line between them. Mobile terminals are integrating more and more capability typically associated with conventional computing devices. For
5 example, cell phones are now able to run software applications and provide Internet access. Accordingly, the term "mobile terminal" shall herein refer to a broad range of devices (e.g. Personal Digital Assistants ("PDA"), Communicators, Smart Phones, and Personal Computers ("PC")) and not solely devices operable merely to
10 communicate in a cellular communication system.

Mobile terminals utilize a range of processing circuitry to perform the functions described herein. The processing circuitry is generally capable of running, i.e., executing, content, also referred to herein as an application program. The terms content and application programs
15 shall be used interchangeably herein and shall each refer to digital information. Content, executable or otherwise usable by the processing circuitry is typically stored at a memory device which is accessible by the processing circuitry. Downloading content to a mobile terminal is regularly performed. Oftentimes content is
20 downloaded to a mobile terminal directly or indirectly utilizing the WWW. If an application is downloaded directly the mobile terminal has the capability to connect directly to the WWW. Whereas, if content is downloaded to a mobile terminal indirectly an intermediate device such as a PC is used. A Nokia 9000 Series™, for example,
25 permits the downloading of content thereto by way of a cable or infrared connection from a source, such as a personal computer.

As noted above, existing mobile terminals are capable of receiving content downloaded thereto. Increased amounts of, and types of, content shall likely be available to be downloadable to a
30 mobile terminal in the future. Some, and perhaps much, of such content is private-domain content. That is to say, an owner, or other entity, has property rights in such content, and is entitled to payment

for use of such content. Convenient manners by which to market, distribute and pay for such content are needed.

Software application providers are using numerous pricing models to provide applications over the WWW to PC users. These models range from providing applications at no cost to full cost.

"Freeware," as the term implies, refers to an application that a PC user is able to obtain without any payment. With freeware the user has full rights to the software, including the source code. Linux is an example of a freeware product. Some application providers do sell freeware, typically on a Compact Disk Read Only Memory ("CD-ROM").

However, the freeware is bundled with installation help programs and additional software. It is the packaging and additional software that is being paid for, not the freeware itself which is free by default.

"Shareware" is a term that refers to applications that PC users have full rights to at a low price. Typically, however, the payment is voluntary and sent directly to the developers of the application. In addition to freeware and shareware, some applications are simply sold at full price. Full price applications, are purchased by credit card or other money transaction and are fully functional from the start. The application is normally downloaded after the payment transaction has been processed.

In addition to the various pricing models discussed above for users to obtain applications, the functionality of downloaded applications can be restricted in several ways. "Time limited"

applications are applications that are only usable for a certain time after which they become non-functional. Time limited applications generally are associated with an unlocking code wherein the user obtains the code when the purchase price is paid for and is then able to unlock the application, making it functional for a determined time.

Transaction limited applications, are only functional for a set number of uses or starts. Like time limited applications, transaction limited operations generally operate with an unlocking code.

In contrast to time limited and transaction limited applications, limited functionality applications are first obtained for free or for a low price by a user with some key functions disabled. After paying the full price the disabled functions may be enabled or the fully functional application downloaded from the WWW. Limited dataset applications contain an incomplete dataset. Games are often available in a limited dataset where only the first level is available to the user. The limited dataset application is generally freeware, however, use of the complete dataset -- the additional levels -- requires payment of the purchase price.

In the environment of mobile terminals as compared to PC's unique problems are encountered with downloading applications that require new solutions. Ease of payment and user satisfaction are key considerations when determining how best to provide downloadable applications to mobile terminals. Possible payment methods include charging for the application along with the monthly bill, electronic cash, credit card charge and monthly membership fee. These payment methods along with those described herein for PC users (i.e. freeware, shareware, full-price, and time-limited applications) present special problems when implemented for mobile terminals.

The various methods of distributing applications to PC users discussed above were developed in the PC environment. Mobile terminals, however, provide unique problems not encountered with traditional PCs. For example, current mobile terminals typically have less memory available for applications than current PCs. Current mobile terminal applications such as downloadable ringing tones are much less complex than typical PC applications. Accordingly, a mobile phone application cannot typically motivate a user to pay a price anywhere near PC application prices.

With any application PC, Mobile terminal or otherwise, consumers would enjoy the ability to test or try out a new application without paying full price. Accordingly, a manner by which to permit a user to download and application for a limited time, pay a small price,

and test or try out the application is desirable. In addition, mobile terminals generally have much less memory capacity, at the current time, than PC applications. Because of limited memory capacity, a user or the mobile terminal itself may have to eliminate an old application in memory to make room for a new application in memory. If a consumer has paid full price for several applications that do not fit in the memory of the users mobile terminal that user will not be willing to pay for the applications that do not fit. Therefore, a manner by which to permit a user to pay for an application once but be able to download that application on subsequent occasions for a reduced fee or at no cost would be desirable. Moreover, the installing and deinstalling of applications should be as simple and or automatic as possible providing the mobile terminal with an uncomplicated seamless experience. Accordingly, there is a need for new manners by which to provide applications to mobile terminals. The invention herein solves these problems.

SUMMARY OF THE INVENTION

An embodiment of the present invention provides a method that records user identity when downloading an application from a server to a mobile phone so that application later can be downloaded again without separate charge. An embodiment of the present invention also provides a method by which an application with limited lifetime on the mobile phone can uninstall itself and thus free memory space for new applications. The terms delete and uninstall are used interchangeably herein.

One embodiment of the present invention is an apparatus for a communication system. The communication system comprises a mobile terminal capable of communicating by way of a radio link with network infrastructure. The mobile terminal comprises memory for at least one application. The apparatus comprises an application

database, a detector and an application-license database. The application database is coupled to the network infrastructure and contains at least a first application downloadable to the mobile terminal. The application(s) in the application database have a selectable lifetime during which the application is executable. In addition, the applications may be configured to delete or uninstall themselves from memory of the mobile terminal when their lifetime expires. The applications may be preprogrammed to delete themselves according to a preset lifetime or configured to delete themselves after the lifetime is selected. The lifetime may be calculated on time or transaction basis.

The detector is coupled to the network infrastructure and detects requests generated by the mobile terminal for downloading an application to the mobile terminal for a selected lifetime. The application-license database is also coupled to the network infrastructure and is configured to store the selected lifetime for the application. By storing the selected lifetime in the application-license database the user may download the same application at a later time for a lesser fee than originally paid for the application, if the lifetime for the application has not expired. The lesser fee includes paying no fee for subsequent downloads.

Another embodiment of the present invention is a method for downloading an application to a mobile terminal from an application database containing at least a first application. The application has a selectable lifetime during which the application is executable. The lifetime may be preprogrammed in the application or programmed in the application after the lifetime is selected. When the user of the mobile terminal chooses an application to download, the user also selects the lifetime for that application during which the application is executable. The lifetime may be determined on a transaction or time basis. The application is then downloaded to the mobile terminal from an application database. The user's identification and lifetime selection is also stored in an application-license database.

When the application is downloaded to the mobile terminal it may be configured to delete itself or uninstall itself from memory of the mobile terminal when the lifetime expires. In addition, the user may be required to pay a fee for the application when it is first downloaded.

- 5 However, because the user selects, and may pay for, a lifetime and that lifetime is stored in the application-license database the user is able to download the same application at a later time for a reduced fee or no fee depending on the lifetime remaining for the application.

BRIEF DESCRIPTION OF THE DRAWINGS

- 10 Figure 1 illustrates a functional block diagram comprising the devices and modules of a communication system in which an embodiment of the present invention is operable;

- 15 Figure 2 illustrates another functional block diagram of the communication system shown in Figure 1 here further illustrating the devices and modules used during operation of an embodiment of the present invention;

- 20 Figure 3 illustrates a flowchart describing the operation of an embodiment of the present invention; and

Figure 4 illustrates another flowchart describing the operation of a further embodiment of the present invention.

DETAILED DESCRIPTION

- 25 Referring first to Figure 1, a communication system, shown generally at 100, provides for communications with a mobile terminal 110. Within the mobile terminal 110 is at least one memory unit 112 for storing an application. The mobile terminal 110 is connected to a network 114 by way of communication path, here a radio link 116. The
30 network 114 comprises network infrastructure 124 and a downloading

server 118. The network infrastructure 124 comprises various hardware devices and associated software for receiving and processing signals transmitted upon the radio link 116 by the mobile terminal. In the exemplary implementation in which the network 114 is a cellular communication network, the signals form electromagnetic signals.

The network infrastructure 124 is connected to a downloading server 118. The downloading server 118 and, in turn, the network infrastructure 124 is connected to both an application database 120 and an application-license database 122. The application-license database 122 comprises data about each mobile terminal users application licenses. The application-license database 122 is accessible by the downloading server 118 whenever a mobile terminal user attempts to download an application. The application-license database 122 stores individual mobile terminal users' application licensing information including lifetime selections. The lifetime selections are discussed below along with Figures 3 and 4.

The application database 120 stores various applications 126. The applications 126 are available for downloading to the mobile terminal 110 via the downloading server 118 and other necessary network infrastructure 114.

Referring to Figure 2, a communication system, here shown generally at 200, again provides for communications with a mobile terminal, here mobile terminal 210. The mobile terminal 210 comprises an input device 218, an output device 216, a Central Processing Unit ("CPU") 214, memory for at least one application 212 and a user identity module 220. The range of possible input devices 218 includes, e.g., a keyboard, a touchscreen and a voice recognition module. The range of possible output devices 216 includes, e.g., a display screen and a speaker.

The user identity module 220, in the exemplary implementation, is formed of a Subscriber Identity Module ("SIM") at which an International Mobile Equipment Identity ("IMEI") is stored. Both the

SIM and the IMEI are specified in the Global System for Mobile Communication ("GSM") technical standards. Although this specification refers to GSM devices, it is not intended to be limited to GSM devices. In a GSM network the user's subscription identity to the network is contained in the SIM. The SIM allows the GSM network to identify the mobile terminal user. The SIM is linked to a user's subscription to the GSM network and not a particular mobile terminal and therefore may be used with different mobile terminals. A GSM mobile terminal is identified by the IMEI. An IMEI is a unique 15-digit number. The SIM in conjunction with the IMEI identify the user and the user's mobile terminal to the GSM network.

The mobile terminal 210 is able to communicate with a downloading server 230 at the personal service provider by way of a mobile network and packet data backbone 231. The server 230 is linked to an application-license database 232 and an application database 242. The application-license database comprises user identification information 234, user application selections 236 and application lifetime information 238. The user identification information 234 may comprise both SIM and IMEI information. The application selections 236 may comprise both current and past application selections. The application lifetime information 238 is discussed further below along with Figures 3 and 4.

The application database 242 contains the applications available for downloading to the mobile terminal. The application database 242 comprises at least one application 244 and an application identifier 246 associated with the application. Two applications, application 1 and application 2, are shown in the Figures 1 and 2 for purposes of example.

In the case of a mobile terminal user having a subscription to a particular cellular network, that user communicates by way of the mobile network, as part of the subscription, and the packet data backbone 231. The user, however, may communicate over other networks for a fee or change subscriptions. Moreover, a user may

desire to download applications while using another network. Accordingly, in the exemplary implementation, the packet data backbone portion of the mobile network and backbone 231 is a public backbone, such as the Internet backbone so that the license
5 information stored in the user application database 232 is accessible in other manners through the public backbone.

Referring to Figure 3, a flowchart, shown generally at 300, illustrates operation of one embodiment of the present invention. At block 310 a mobile terminal user starts a downloading service. A
10 downloading service provides applications for mobile terminals. The downloading service may be accessed directly by the mobile terminal, indirectly from a PC or otherwise. A downloading service is oftentimes implemented in the form of a website, either commercial or non commercial. The website provides links to various applications
15 available for download. If the downloading service is run indirectly on a PC, the application is first downloaded to the PC. The mobile terminal must then allow the downloading of the application from the PC to the mobile terminal. Downloading from a PC to a mobile terminal, for example, is implemented in a Nokia 9000 Series™ mobile
20 terminal by way of a cable or infrared connection.

At block 312, the user chooses an application. Choosing an application, in the case of a website implemented downloading service, may be achieved by selecting the link to that application. After clicking the link to an application, at block 314 the user selects a lifetime for
25 the application. The lifetime represents the time during which the application will be executable and/or the time during which the application will reside in the memory of the mobile terminal. The application chosen is automatically configured, before downloading, to cease functioning or delete itself from the memory of the mobile
30 terminal after the selected lifetime expires.

The user, at block 314 has a plurality of choices for lifetimes. The price of the application, at block 316, may be dependent on the selected lifetime. For example, use of the application three times may

be free, use of the application ten times or for one week may be \$2.00, use of the application 100 times or for a month may be \$5.00 and use of the application for an unlimited amount of time may be \$10.00.

At block 316, the user pays for the application. The payment price may be dependent on the selected lifetime. For example, if the user selects a lifetime of one week the user pays \$2.00. After the application is paid for, the application is downloaded to the mobile terminal at block 318. The lifetime of the application may be tracked by the application itself, by the downloading service or otherwise. If the application tracks its own lifetime, the application is automatically configured at downloading to delete itself according to the user's selected lifetime. In the example above the application would automatically delete itself after one week. If the user had selected ten uses instead of one week, the application would automatically delete itself after ten uses.

Deletion comprises freeing all memory space used by the application and corresponding data or only freeing some specified portion of the memory space used by the application. For example, when the lifetime expires the application deletes its own executable code, however, the application's corresponding data and libraries are not deleted. If the application is customized by the mobile terminal user, the customized settings are retained even after the application deletes itself. Accordingly, if the same application is downloaded on a subsequent occasion the user's customized settings are retained.

At block 320, the application determines if it's lifetime has expired. If so, the application deletes itself at block 322. If not, the application does not delete itself and allows the user to continue using the application.

Referring to Figure 4, reference numeral 400 refers to another flowchart illustrating further operation of an embodiment of the present invention. At block 410 a dynamic application downloading sequence is started. The first operation is connecting to a downloading service at block 412. As mentioned earlier in conjunction with the description

of Figure 3, the downloading service may run directly on the user's mobile terminal, indirectly on a PC or otherwise. The downloading service may be accessed through a website. The website provides links to various applications available for download. If the downloading
5 service is run indirectly on a PC, the mobile terminal must allow the downloading of the application from the PC to the mobile terminal. This may be achieved by way of a cable or infrared connection between the PC and the mobile terminal.

The user's identity information (e.g. SIM and IMEI information) is
10 also supplied to the downloading service. If the downloading service is run directly on the mobile terminal, the user's identity information SIM information and IMEI information is automatically transmitted to the downloading service. If the downloading service is run directly on the mobile terminal, the user's identity information is automatically
15 transmitted to the downloading service. The user identity information is then stored in the application-license database 122 or 232, referring to Figures 1 and 2 respectively.

At block 414, the user selects an application. If the downloading service is implemented in a website, the user selects the link to that
20 application. The downloading service then determines if the user has previously paid for an unlimited application lifetime at block 416. For example, referring to Figure 2, the downloading service through the downloading server 230 will compare the user's identity 220 to user identification information 234 in the application-license database 232.
25 If there is a match between the current user identity 220 and user identity information 234 in the database, a further comparison is made to determine the licensing information 236, 238 for the user. The license-database 232 keeps track of a particular users current and past application selections and the lifetime for those applications. If the
30 user previously paid for an unlimited application lifetime the license-database 232 will contain that information. If the user has previously paid for an unlimited lifetime the application is downloaded at block 426 without a reduced fee or without a fee for the application. Note,

because the user has paid for an unlimited lifetime the user may be able to download the application to multiple mobile terminals – wherever he or she has plugged in their SIM card.

Block 416 may be modified to determine if the user has lifetime remaining from a previously paid for application, even if the user has not paid for an unlimited application lifetime. This is especially important in current mobile terminals with little memory available for applications. If a user needs to download an application to his or her mobile terminal when there is no memory available to store the application, the user will have to delete an existing application or an application may be deleted automatically to make room for the new application. The deleted application may have lifetime remaining. Accordingly, the license-database 232 stores the application lifetimes 238 for each application a particular user has selected. If at block 416 the downloading service determines that life remains from a previous selection of the application, the application is downloaded to the user's mobile terminal 110 at block 426 and stored in a memory element 112. When an application is downloaded to a mobile terminal 110 at block 416 with lifetime remaining, the application is configured to automatically delete itself from the memory 112 of the mobile terminal 110 when the remaining lifetime expires.

If the user has not paid for an unlimited lifetime on a previous occasion or does not have lifetime remaining from a previous selection, the user must now select the desired lifetime for the application at block 418. Available lifetimes correspond to different payment requirements. At block 420 the downloading service determines if the selected lifetime requires payment. For example, use of the application three times or for a week may be free whereas use of the application ten times or for a month may be \$2.00. If the lifetime selected does not require payment the application is downloaded to the user's mobile terminal 110 at block 426 and stored in memory 112. If the application does require payment the user pays for the application at block 422. Payment methods include credit card charging,

electronic cash, monthly fee or membership, and charging along with network subscription and use payments (e.g. the cell phone bill). The application, before downloading at block 426, is automatically configured to delete itself when the selected lifetime 418 expires.

5 At block 424 the downloading service records the user's identification information in the application-license database 232. As discussed earlier, the user identification information includes the application selection, and application lifetime selection for the user. In a GSM network, the user identification information will also include SIM
10 and IMEI information. After the user has paid for the application at block 422 and the user's information is recorded at block 424, the selected application is downloaded to the user's mobile terminal 110 and stored in memory 112 at block 426. Downloading may occur directly to the mobile terminal or indirectly to a PC or otherwise. If
15 indirectly, the application must then be downloaded from the PC to the mobile terminal using some type of link such as an infrared connection or a cable.

 If during the selection process and downloading process represented by blocks 412 through 426, it is determined that there is
20 insufficient memory for a new application there are several possible results. First, the downloading operation may be cancelled either automatically or manually by the user. Second, the user may choose to remove an existing application from his or her mobile terminal. In the latter case, if the user has selected to remove an application with
25 lifetime remaining the user can later download this application at a reduced cost or at no cost if the user does so while lifetime remains for the deleted application. The ability to download an application with remaining lifetime is discussed above in reference to block 416.

 Once the application is downloaded at block 426 the user may
30 use the application 428. Each time the user subsequently attempts to use the application, the application queries itself to determine if it has an unlimited lifetime 430. If the application determines that it doesn't have an unlimited lifetime, the application determines if its lifetime has

expired at block 432. If the lifetime has not expired, the user may use the application. If the lifetime has expired, the application automatically deletes itself at block 434.

5 The apparatus and method described herein provides a manner by which a mobile terminal user may download an application to a mobile terminal and select a lifetime for that application. By storing the user's identity, application selection and lifetime selection in a license-database that is accessible by a downloading service, the user is able to download the same application to a mobile terminal on subsequent
10 occasions for a reduced fee. Moreover, the application deletes itself automatically from the mobile terminals memory after its lifetime expires. The features of this invention provide a convenient manner by which to obtain applications and try applications for a limited time. Moreover, the features of this invention provide a convenient manner
15 by which to free-up memory in a mobile terminal by deleting an application and then obtaining the deleted application later on without having to pay twice for the application.

The invention also provides a convenient manner by which to obtain applications on an as needed basis. The user can then
20 effectively use many more applications than would otherwise be possible if the applications had to permanently reside in the mobile terminal memory or be paid for every time they were downloaded to the mobile terminal. This feature is especially important given the portable nature of mobile terminals.

25 The previous descriptions are of preferred examples for implementing the invention, and the scope of the invention should not necessarily be limited to this description. The scope of the invention is defined by the following claims: